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BOOKS OLD AND NEW IN MATHEMATICS

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Inasmuch as the list of recent books for secondary schools published in the June number of the *School Review*¹ contained only one title in mathematics, it may be in order to call the attention of teachers of secondary mathematics to numerous other recent books of importance, and to include therewith also a selected list of older standard books, so as to make up a small working library which may fairly be considered necessary to have within the working radius of the teacher. The following list includes books on algebra, geometry, trigonometry, plane analytics, and elementary calculus as the *minimum* range within which the secondary teacher can afford to be limited. For the most part the high-school texts in common use are not mentioned, and to the list have been added some volumes of general importance and interest on the history and present development and tendencies of the teaching of mathematics.

I. ALGEBRA

Introduction to Algebra. By G. Chrystal. New York: The Macmillan Co.

This and the next following are excellent reference books for teachers of algebra for constant use.

A Text-Book of Algebra with Exercises. By G. E. Fisher and I. J. Schwatt. New York: The Macmillan Co., 1898.

Text-Book of Algebra. In two parts, I and II. By G. Chrystal. London: Adam & Charles Black, 1889.

These are standard books on algebra, covering both elementary and advanced subjects.

The Principles of Elementary Algebra. N. F. Dupuis. New York: The Macmillan Co., 1892.

A suggestive and helpful little volume.

¹ "Books of the Year for the Teachers' Library" is the title of the list in the June number of the *School Review* evidently referred to. Few, perhaps, of the books listed by Professor Slaughter could well have been given a place among "books of the year," judging from the dates of their publication, but we gratefully welcome the opportunity of making available to the readers of the *School Review* so valuable a list of mathematical books.—ED.

A Treatise on Algebra. By Charles Smith. New York: The Macmillan Co., 1892.

This and the other texts by this author are standard treatises.

College Algebra. By H. B. Fine. Boston: Ginn & Co., 1905.

An excellent presentation of the fundamental principles.

Graphic Algebra. By A. W. Phillips and W. Beebe. New York: Henry Holt & Co., 1887.

A geometric interpretation of the theory of equations.

An Introduction to Graphic Algebra. By F. E. Nipher. New York: Henry Holt & Co., 1898.

An elementary introduction to graphic work in algebra for the use of high schools.

Number and Its Algebra. By Arthur Lefevre. Boston: D. C. Heath & Co., 1896.

An important little volume for every teacher of algebra.

The Number-System of Algebra. By H. B. Fine. New York: Leach, Shewell & Sanborn (now published by Benziger Brothers), 1891.

Similar in content to the preceding, but more compact and scientific in form of statement.

College Algebra. By L. E. Dickson. New York: John Wiley & Sons, 1902.

College Algebra. By J. M. Taylor. Boston: Allyn & Bacon. Revised 1904.

A text using the elementary notions of the calculus in its development.

College Algebra. By G. A. Wentworth. Boston: Ginn & Co. Revised 1898.

Algebra for Colleges and Schools. By H. S. Hall and S. R. Knight. Revised and enlarged for the use of American Schools by F. L. Severn. New York: The Macmillan Co., 1896.

Elementary Treatise on Determinants. By William G. Peck. New York: A. S. Barnes & Co. (now American Book Co.), 1888.

A good book to supplement the chapters on this subject in the college algebras. But better to read the volume noted next below.

The Elements of Determinants. By Paul H. Hanus. Boston: Ginn & Co., 1888.

This is pure algebra, a knowledge of which any teacher of algebra should certainly possess.

The Theory of Equations. By S. M. Barton. Boston: D. C. Heath & Co., 1899.

This is also elementary algebra of the utmost importance to the teacher. An admirable introduction to this subject.

II. GEOMETRY

Elements of Euclid. By I. Todhunter. Revised and enlarged by S. L. Loney. New York: The Macmillan Co., 1883.

Lest we forget that geometry was a well-organized science before the dawn of the Christian era.

Non-Euclidean Geometry. By H. P. Manning. Boston: Ginn & Co., 1901.

Lest we suppose that the Euclidean is the only logical geometry which the human mind can build.

The Art of Geometry. By Arthur L. Baker. Boston: Sibley & Co.

A laboratory manual for the use of students of geometry.

Famous Problems of Elementary Geometry. By Felix Klein. Translated by W. W. Beman and D. E. Smith. Boston: Ginn & Co., 1897.

No teacher of geometry should be without a command of the matter contained in this little book.

An Advanced Course in Geometry. By Edward Olney. New York: Sheldon & Co. (now American Book Co.), 1879.

A good collection of exercises in geometric invention, including work in solid and spherical geometry and the elements of modern geometry.

Elementary Solid Geometry and Mensuration. By H. D. Thompson. New York: The Macmillan Co., 1896.

An excellent book for teachers of geometry.

Elementary Plane Geometry. By James McMahon. New York: American Book Co., 1903.

A thoroughly scientific book. Should be in the hands of every teacher of geometry.

Plane and Solid Geometry. By George C. Shutts. Chicago: Atkinson, Mentzer & Grover, 1904.

A good exponent of the inductive method.

The Elements of Geometry. By Henry W. Keigwin. New York: Henry Holt & Co., 1898.

A book somewhat on the inductive plan.

Manual of Plane Geometry. By G. I. Hopkins. Boston: D. C. Heath & Co., 1891.

A book on the heuristic plan, with numerous exercises for advance work.

Geometry in the Grammar School. An essay by Paul H. Hanus. Boston: D. C. Heath & Co., 1898.

An important point of view for the high-school teacher of geometry who wishes to be master of the situation.

Monographs on Famous Geometrical Theorems and Problems. By William E. Rupert. Boston: D. C. Heath & Co., 1900.

Four parts: I, II, III, IV. These contain much interesting and valuable material, both historical and critical.

Introductory Modern Geometry. By W. B. Smith. New York: The Macmillan Co.

An elementary presentation.

Rational Geometry. By G. B. Halsted. New York: John Wiley & Sons.

An excellent elementary textbook from the modern view-point. See also numerous articles by the author in the *American Mathematical Monthly* (published at Springfield, Mo.), Vols. I-IX.

Elementary Geometry, Plane and Solid. By Thomas F. Holgate. New York: The Macmillan Co.

A book which seems to possess many excellent features.

Practical, Plane and Solid Geometry. By Joseph Harrison. New York: The Macmillan Co.

Exceedingly suggestive in the way of practical applications of geometry.

Experimental and Theoretical Geometry. By A. T. Warren. Oxford: Clarendon Press.

Valuable in establishing the proper connection between the abstract and the concrete.

Geometric Exercises in Paper Folding. By T. S. Row. Translated by W. W. Beman and D. E. Smith. Chicago: The Open Court Publishing Co., 1901.

Most helpful by way of suggestion as to possible lines of interest connected with geometry.

Science and Art Drawing. By J. Humphrey Stanton. New York: The Macmillan Co.

Both elementary and advanced work. No teacher of geometry should be without the facility and power given by mastery of at least the elements of such a course.

III. TRIGONOMETRY

Plane and Spherical Trigonometry. By Daniel A. Murray. New York: Longmans, Green & Co., 1899.

A clear and helpful presentation from the standpoint both of the science and of the practical uses of the subject.

A Treatise on Trigonometry. By E. A. Bowser. Boston: D. C. Heath & Co., 1892.

Valuable especially in exhibiting trigonometric series and the way in which they are used in computing the values of functions.

A Drill-Book in Trigonometry. By G. W. Jones. Ithaca, N. Y., 1896.

As the title indicates, this is a drill-book and fully justifies its title.

Plane Trigonometry. By S. L. Loney. New York: The Macmillan Co., 1893.

Part I, Solution of Triangles; Part II, Analytic Trigonometry.

A full and scientific treatise, especially useful to the teacher.

An Elementary Treatise on Plane Trigonometry. By E. W. Hobson and C. M. Jessop. New York: The Macmillan Co.

This is a good treatment of the computational side of trigonometry.

A Treatise on Trigonometry. By E. W. Hobson. New York: The Macmillan Co., 1892.

This is a thoroughly scientific treatise on analytic trigonometry, giving the teacher an idea of the importance of this point of view in contrast to mere goniometry.

Plane Trigonometry. By J. M. Taylor. Boston: Ginn & Co., 1906.

One of the best recent working elementary textbooks on this subject.

A Text-Book of Plane Surveying. By William G. Raymond. New York: American Book Co., 1896.

An admirable elementary treatise on the applications of trigonometry to plane surveying.

Workshop Mathematics. By Frank Castle. Parts I and II. New York: The Macmillan Co.

This and a score of similar volumes recently issued, largely in England, indicate the present effort to attach the study of mathematics to the concrete side of life. These books usually cover the whole range of elementary mathematics.

IV. ANALYTIC GEOMETRY

Analytic Geometry for Beginners. By T. G. Vyvyan. New York: The Macmillan Co., 1899.

A simple treatment of the point, line, and circle.

Plane and Solid Analytic Geometry. By F. H. Bailey and F. S. Woods. New York: Ginn & Co., 1897.

An excellent development of the geometry of the conic sections with well-graded exercises.

An Elementary Treatise on Conic Sections. By Charles Smith. New York: The Macmillan Co., 1888.

A thorough analytic presentation of the subject, most stimulating to any mathematical mind.

Geometrical Conics. By Charles Smith. New York: The Macmillan Co., 1898.

A thorough geometrical presentation of the subject.

An Elementary Course in Analytic Geometry. By J. H. Tanner and Joseph Allen. New York: American Book Co.

Besides the conic sections, numerous higher plane curves are treated in an elementary manner.

The Elements of Analytic Geometry. By Percy F. Smith and Arthur S. Gale. New York: Ginn & Co., 1904.

This is especially full and thorough in the discussions and applications over a very wide range of matter. It is an excellent book for teachers to know.

V. CALCULUS

Elementary Calculus. By Percy F. Smith. New York: American Book Co., 1902.

A very simple and brief textbook for the use of students in general science. Its purpose is to introduce students in thirty or forty lessons to many branches of science otherwise closed to them.

Infinitesimal Calculus. By Irving Fisher. New York: The Macmillan Co., 1897.

Intended as an introduction to the use of the calculus in modern economic theory, but adapted to the needs of any who wish a short course in the calculus as a matter of general education.

The Elements of the Differential and Integral Calculus. By J. W. A. Young and C. E. Linebarger. New York: D. Appleton & Co., 1900.

Especially designed for those who wish an introductory knowledge of the calculus for use in the natural sciences, and for those who wish in a short course to gain a view of analytics and calculus as powerful instruments in modern investigation.

An Elementary Course in Infinitesimal Calculus. By Horace Lamb. New York: The Macmillan Co., 1897.

A most suggestive and stimulating text on the calculus and its applications.

Introduction to the Calculus. By George A. Gibson. New York: The Macmillan Co., 1903.

An elementary treatise based on graphical methods.

The Elements of the Differential and Integral Calculus. By Donald F. Campbell. New York: The Macmillan Co.

A book designed especially for introducing the student to engineering courses.

Elements of the Differential and Integral Calculus. By William A. Granville. Boston: Ginn & Co., 1904.

A thoroughly scientific and practical textbook on the calculus.

Graphical Calculus. By Arthur H. Baker. New York: Longmans, Green & Co.

A text designed to introduce the student to the use of the graph as an instrument of investigation.

Calculus for Beginners. By John Perry. New York: John Lane, 140 Fifth Avenue.

An excellent introduction to physics.

VI. HISTORICAL AND MISCELLANEOUS

A Brief History of Mathematics. By Karl Fink. Translated by W. W. Beman and D. E. Smith. Chicago: The Open Court Publishing Co.

Includes the elementary subjects up to trigonometry.

Primer of the History of Mathematics. By W. W. R. Ball. New York: The Macmillan Co., 1895.

A condensed outline of the volume noted next below.

A Short Account of the History of Mathematics. By W. W. R. Ball. New York: The Macmillan Co., 1903.

This includes the topics of the subject from the earliest times down through the last century.

A History of Mathematics. By Florian Cajori. New York: The Macmillan Co., 1899.

This is a standard work giving a clear exposition of the development.

On the Study and Difficulties of Mathematics. By Joseph L. Lagrange. Translated by T. L. McCormack. Chicago: The Open Court Publishing Co.

Very suggestive and helpful.

The Philosophy of Mathematics. By Albert T. Bledsoe. Philadelphia: J. B. Lippincott Co.

An exceedingly stimulating book.

The Common Sense of the Exact Sciences. By W. K. Clifford. New York: D. Appleton & Co., 1899.

A most desirable presentation and discussion for secondary teachers.

Mathematical Essays and Recreations. By Herman Schubert. Chicago: The Open Court Publishing Co.

England's Neglect of Science. By John Perry. London: T. Fisher Unwin, 1900.

This little book marks an epoch in the movement for better teaching of mathematics in England.

Discussion on the Teaching of Mathematics: Meeting of the British Association, 1901. Edited by John Perry. New York: The Macmillan Co., 1902.

Mighty interesting reading.

The Teaching of Elementary Mathematics. By David Eugene Smith. New York: The Macmillan Co.

Invaluable for secondary teachers.

The Pedagogy of Mathematics. By J. W. A. Young. New York: Longmans, Green & Co.

Papers on the teaching of secondary mathematics presented at the meetings of numerous associations of mathematics teachers and reported chiefly in *School Science and Mathematics* and in the *School Review*. These journals contain also each month articles, discussions, reports and announcements which embody helpful suggestions to teachers of secondary mathematics, and, at the same time, because of the wider field covered by each journal, the one in science, the other in general secondary lines, they provide a broad and stimulating influence of a general pedagogical character.